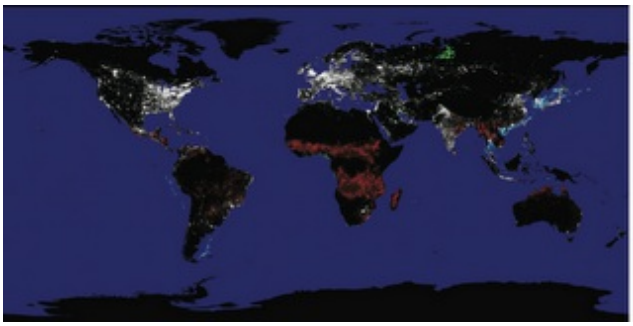
The Oil Drum
DISCUSSIONS ABOUT ENERGY AND OUR FUTURE

Tech Talk - Gas Flares and Their Significance in Russia

Posted by Heading Out on November 20, 2011 - 2:29am
Topic: Supply/Production
Tags: gas flare, gulf of mexico, khanty-manysiyski, natural gas, nigeria, russia, russian production [list all tags]

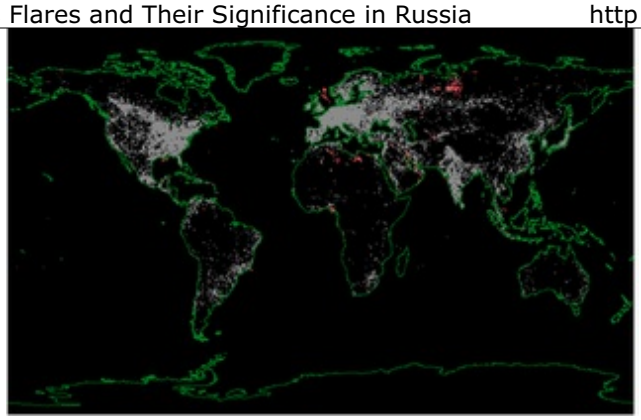
Over the weekend I went to a talk on the promise of shale oil and gas given by Sid Green, a friend and one of those members of the National Academy with Washington influence in regard to the future of the fossil fuel business. (He appears much more a Yerginite than a follower of Matt Simmons, as was evident by his conclusion that the fuels from the shale deposits of the country will be our short-term savior.) This is a proposition to which I have provided some evidence of doubt. However, it was in his introduction by Joseph Smith, the new Laufer Chair of Energy at MS&T, where a slide appeared that is useful to preface where the Tech Talk series will go next. This is the slide:



A poster from NOAA showing the light emitted at night from city lights (white), fires (red), boats (blue) and gas flares (green). (The picture was put together over the period from January to December 2003.)

It was that large green blob sitting just below the Yamal Peninsula in Russia that caught my eye. It shows the volume of stranded natural gas in Russia that is being flared off because it is stranded, i.e. there is no current way to ship it to market.

Interestingly, given that preponderance of flaring in Russia, one can also go to a paper given at a Russian meeting where the more ubiquitous size of gas flaring operations around the world is more evident.

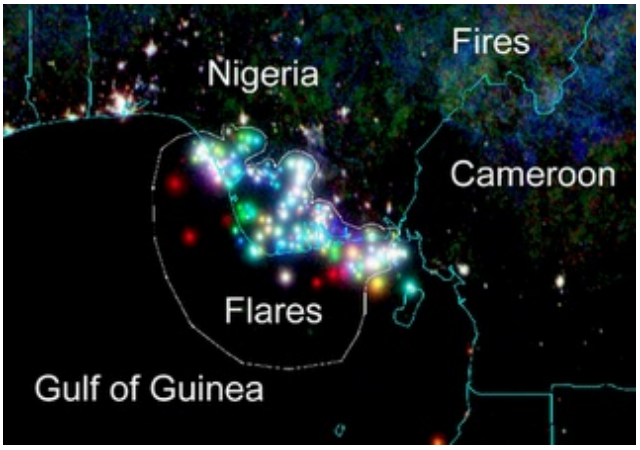


City Lights and gas flares around the world, data collected In 1994-95. (city lights in grey, flares in red).

As I noted in a recent post on developments in the Bakken shale, up to 30% of the natural gas that is being produced with the oil is being flared at the moment because there is no way of getting it to market. (And in 1994, note the amount being flared in the North Sea). It is not just a problem for large wells. For many years I drove between Rolla, MO and Crane, IN, spending the night in Vincennes, usually arriving late, with my drive through Eastern Illinois illuminated by flares from the small stripper wells along the way. And it is possible to see flares from the rigs operating in the Gulf of Mexico.

Gas flares illuminating the night in the Gulf of Mexico (NOAA)

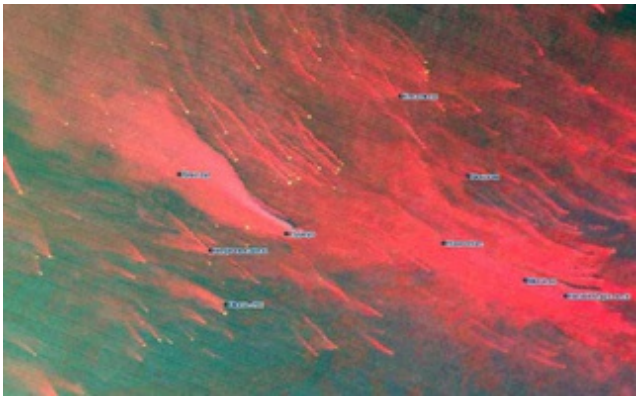
In the past, Gregor Macdonald has also documented the flares that are found off the coast of Nigeria. And there was some suspicion that these represented the greatest volume of gas being burned off in this way.



Flares around Nigeria color coded by duration, Those active in 2006 and 2000 are yellow.

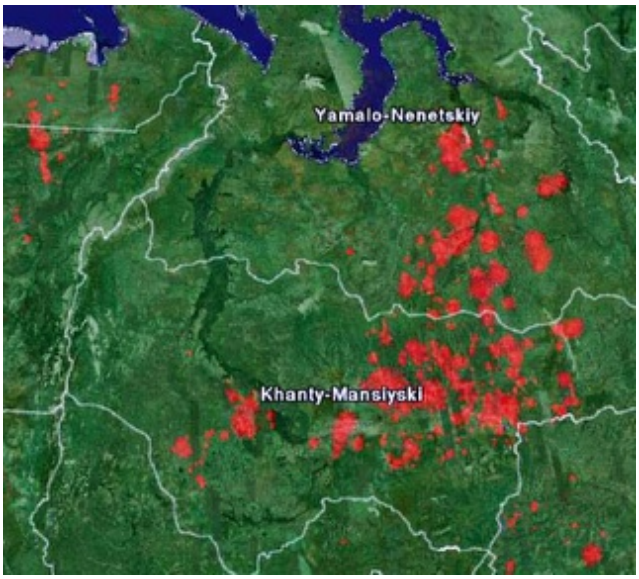
Those active in 2000 but not 1992 or 2006 are green. Those active in 1992 but not 2000 or 2006 are blue. (NOAA)

A 2007 survey carried out by NOAA for the World Bank showed that Russia was burning roughly twice the volume of gas as that lost in Nigeria. A close look shows how the plumes from the flares dominate the Siberian night-time sky.



Thermal plumes from gas flares in Siberia

The NOAA report indicates that around 160 billion cubic meters of gas is flared each year, roughly a quarter of the volume of natural gas that is used in the United States each year. And while countries such as Nigeria have been able to reduce the amount that is flared, countries such as Russia, Kazakhstan, and Iraq have increased the volumes flared. (It also explains how the images above were generated). The region of Russia with the most gas flaring is that around the Khanty-Mansiysk region, which accounts for roughly half the Russian total. In 2007, a conference on the subject heard that Russia was flaring around 50 bcm per yer, with Khanty-Mansiysk contributing 24 bcm of this total. (The gas is flared because this is currently where about half of Russia's oil production is coming from). At that time the goal was set that by the end of this year, (2011) some 95% of this natural gas should be utilized. There have been a variety of ways suggested to reach that goal. Again, putting the volumes in context, Russia commercially produced some 600 bcm of natural gas in 2006, as well as some 10 million barrels of oil a day.



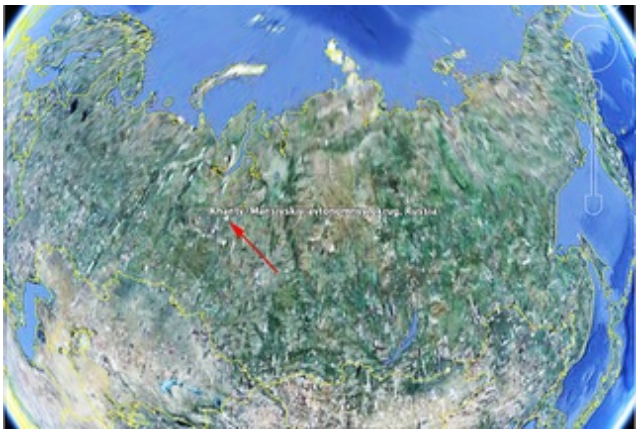
Flaring around the Khanty-Manysiyski region south and east of Yamal. (World Bank)

At present Russia has reached a new peak in crude oil production of some 10.34 mbd for October,

while Saudi production is estimated to have risen to 9.8 mbd. Russia is thus the current largest oil producer, and so it is time to look at where the oil is coming from (other than just the region shown above), and what the prospects for the future hold for the longer term production and export of energy from that country.

The natural gas production picture is not quite that rosy, even with the reduction in gas flaring that has been undertaken. Gazprom is reported to have reduced supply as prices in Europe have risen towards $15 per kcf (thousand cubic feet), almost four times that of gas in the United States. Russia as a whole produced some 1.8 bcm/day (63 bcf) of which Gazprom produced 1.35 bcm, both figures down from the same time last year. At the same time, domestic consumption of natural gas has risen by some 1.3 bcf/day. Russia supplies about a quarter of European demand, and as production falls off in some of the fields of Western Europe that portion may increase. However, the global supply of natural gas is still quite healthy with countries seeking to find domestic sources from the gas shales that might lower their import needs. Thus the power that Gazprom was able to wield just a couple of years ago has now been somewhat reduced.

All of these factors strengthen the conclusion that this series should now move to look at some of the fields in Russia, and given that Dr Yergin has proved to be a better historian than prophet, that probably means that I should go away and re-read The Prize, before it starts. (Though The Quest is an easier read). After all, one wonders how many of us, a week ago, could have found Khanty-Manysiyski on a map?



Location of Khanty-Manysiyski on a map of Russia (Google Earth)

In passing, Secretary Salazar has just announced that permitting will allow the Natural Buttes Project to move forward. Anadarko are expected to develop up to 3,675 wells in the Uintah Basin over the next decade to supply more cheap natural gas into the market, and likely keep the price pressure on the production of gas from gas shales. Which brings me full circle back to the opening of the post, since the question that I asked Sid at the presentation was “How long can the gas shale companies afford to sell their gas at under $4 per kcf, when it is costing them more than this to produce it?”

I had a short snippy version of Sid's reply here, but he was kind enough to send a critique and deeper explanation, which gives a better answer than initially drafted. To summarize his answer, he feels very much in agreement with the points that Rockman has been making in comments on a number of my posts on this topic.

He notes that financing for the E&P companies has recently largely come from "venture capital" money. The companies are able to recover much of their own capex in the first months, but he was careful to note that this did not imply that they are able to make a profit. And with that return they are able to continue on the “tread mill” of drilling another well, and another . . . .

He quoted costs, and noted that a recent WSJ article said that Pioneer was reported to have costs of around $2.48 per kcf. Though if I can interject they are drilling the Eagle Ford and thus the costs may be lower for the gas, since they are, as he notes, making most of the money from the associated liquids. (And Rockman is not that excited about the general situation down there).

However, he thinks Haynesville costs are up to $3.50 and Marcellus up to $4.00 or more per kcf. As a result the number of rigs might soon start falling, though he has hopes that with some technical improvements the cost figures might come under better control, and he senses that there are others in the industry also anticipating greater production at lower cost with some of the better ideas that are being developed. These relate (HO thinks) to better control of the fracture paths induced out into the formations. But without much change operations will move over to more liquid productive areas and the natural gas situation will not be sustainable as it is.

As an additional side comment, there are now animated maps of the Barnett, Bakken, and Eagle Ford plays, showing the wells drilled each year, and the production totals, under the Shale Play Development History Animations sections of the EIA map page. (H/t this weeks TWIP which is on the Bakken and Eagle Ford.)